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Funded by: Life Sciences Undergraduate Research Opportunity Program

## Fescue toxicosis affects the reproduction and thermoregulatory systems of male rats exposed to heat stress

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Tall fescue (*Festuca arundinacia*), a cool season forage grass, has been utilized by many farmers for over fifty year to feed livestock. Unfortunately, about half of fescue pastures are infected with an endophytic fungus (*Acremonium coenophialum*). The fungus produces toxins which cause health and reproduction problems in animals resulting in economic losses. Previous studies have found that intake of infected fescue during hot weather produces hyperthermia, rough hair coats, increased respiration rates, lowered milk production, dystosia, lameness, decreased feed intake and average daily gain, and reduced prolactin, progesterone, and cholesterol levels. This study was done to investigate the effects of heat stress combined with infected tall fescue seed and associated decreased feed intake on male reproduction. Twelve male rats were implanted with telemetric thermometers (Mini-Mitter, Inc.) to record core body temperature and activity every ten minutes. Rats were randomly assigned to either heat stress (HS; 31° C) or thermoneutral conditions (TN; 21° C) and fed one of three diets: endophyte-infected seed (E+), endophyte-free seed (E-), or E- diet fed in the same amount as consumed by the E+ rats the preceding day. Feed intake and body weight were recorded daily. Semen was examined for sperm motility, concentration and morphology. Tissue samples were removed from testis, epidymis, seminal vesicles, and liver and examined histologically. Other organs were collected and weighed. Toxin, heat stress, or feed restriction caused a similar reduction in growth rate, but all showed some recovery by the end of the study ( $P < .0013$ ). Liver ( $P < .0096$ ) and heart ( $P < .01$ ) weights decreased in treatment animals. Core body temperature showed differences between treatments; E+ rats showed hyperthermia and adaptation towards the end of the study. Activity was extremely variable and no conclusions could be drawn, given that each group was assigned only 1-2 animals. There was no significant effect on kidney, adrenal, spleen, testes, and seminal vesicle weight. The rough hair coat characteristic of fescue toxicosis was also observed in E+ rats. Analysis of sperm function and morphology are being conducted. Understanding the interaction between fescue toxins, heat stress, nutrition, and reproduction function will help in finding a treatment for fescue toxicosis and developing management strategies.